BIOMASS: ADVANTAGES AND DISADVANTAGES

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From prehistoric times, human beings have harnessed the power of fire by burning wood to create warmth and light and to cook food.

The term "biomass" can describe many different fuel types from such sources as trees; construction, wood, and agricultural wastes; fuel crops; sewage sludge; and manure. Agricultural wastes include materials such as cornhusks, rice hulls, peanut shells, grass clippings, and leaves. Trees and fuel crops (i.e., crops specifically grown for electricity production) can be replaced on a short time scale. Agricultural wastes, sewage sludge, and manure are organic wastes that will continue to be produced by society. For these reasons, biomass is considered a renewable resource.

Biomass obtains its energy from the sun while plants are growing. Plants convert solar energy into chemical energy during the process of photosynthesis. This energy is released as heat energy when the plant material is burned. Biomass power plants burn biomass fuel in boilers. The heat released from this process is used to heat water into steam to turn a steam turbine to create electricity.

Biomass is sometimes burned in combination with coal in boilers at power plants. This process, called co-firing, is typically used to reduce air emissions and other environmental impacts from burning coal. Co-firing biomass with coal may require a coal boiler to be modified somewhat so it can combust coal. When co-fired with coal, only a small amount of biomass is typically added to maintain the boiler's efficiency.

But the combustion can be achieved in the best available wood stoves and furnaces, most open fires and stoves are not so efficient. This means that not only is carbon dioxide released but other combustion products are also emitted, some of which are more powerful greenhouse gases than CO2. In particular, these can include methane, which on a molecule-for-molecule basis has 20 times the global warming potential of CO2 over a 20 year period. This suggests an urgent need to improve the efficiency of traditional wood burning processes. However it should be stressed that the overall global effect of greenhouse gas emissions arising from incomplete biomass combustion in developing countries is probably much less than that of emissions from burning fossil fuels, which occurs mostly in the ‘developed’ countries.

A further problem is that in many ‘developing’ countries wood fuel is being used at a rate that exceeds its re-growth. Also, when it has been gathered, firewood is often burned very inefficiently in open fires. This not only results in excess greenhouse gas emissions, but also gives much less effective warmth that if an efficient stove were used. Moreover, it usually results in high levels of smoke pollution, with very detrimental health effects.